

## Deaths Related to Falls, Collapses, and Trench Cave-ins

In 1999, falls were the leading cause of death in construction, causing 380 of 1,228 work-related deaths from injuries (31%). But the percentage was much higher for some construction occupations. Falls caused 30 of 40 deaths (75%) among ironworkers and 48 of 56 reported work-related deaths (86%) among roofers. The rate of work-related deaths from falls in 1999 among ironworkers was 16 times higher than the construction average and among roofers 6 times higher (chart 37a).

Most of the fatal falls were from roofs (chart 37b), with just under half of those falls being from a roof edge.

At least 52 of the 380 deaths reported as falls in 1999 (14%) resulted from collapses, when the surface a worker was standing on collapsed or tipped over (an aerial lift, for instance). In the 8 years 1992-99, at least 16% of reported fall deaths were collapses (chart 37c).

Trenching-related deaths are more difficult to count. BLS reports do not separate out trenching-related deaths. Such deaths might be listed in "excavation or trenching cave-in," "caught in or crushed in collapsing materials," "explosion," "contact with electric current," and "pedestrian struck by vehicle, mobile equipment on side of road."

A search of computerized BLS fatal injury records for all industries, except mining and shipbuilding, for 1992-99 using keywords "trench," "ditch," "cave," "excav," and "sewer," followed by reading the reports, identified 429 trenching-related

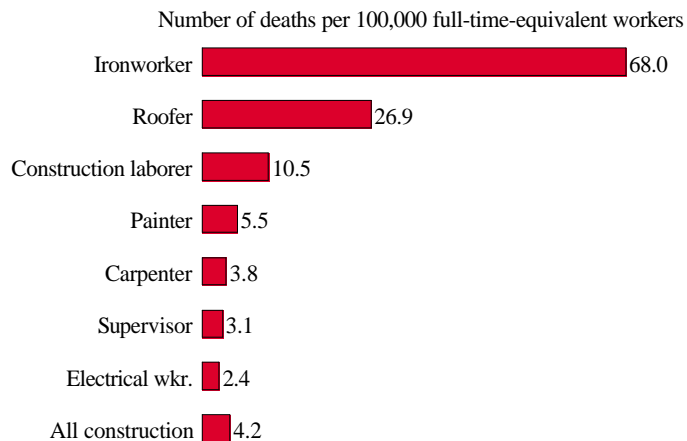
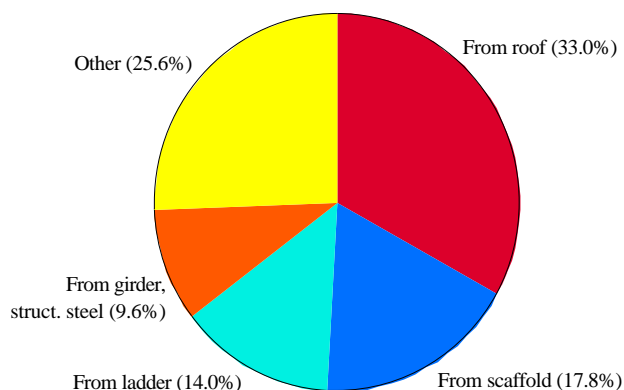
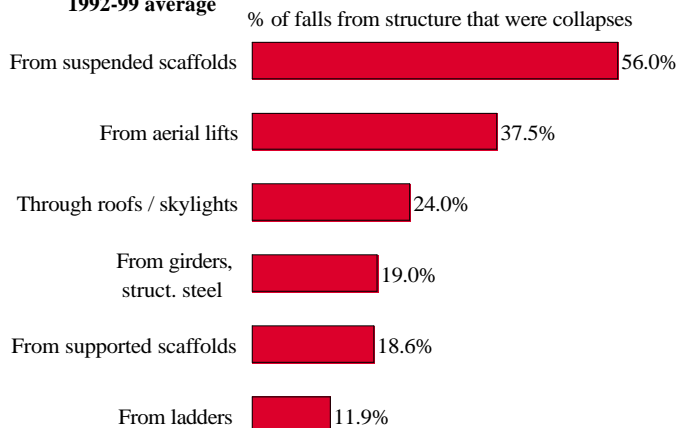
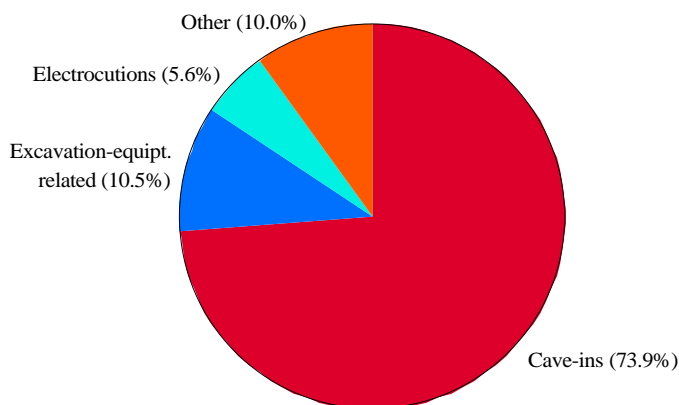
deaths, about 54 per year. Of these, trench wall cave-ins caused 317 deaths (74%), 40 per year (chart 37d). In addition, 44 deaths (11% of the total) involved excavating equipment, particularly backhoes. Almost half of the deaths involving excavator equipment occurred when workers in trenches were struck by backhoe buckets or crushed between a trench wall and excavation equipment. Other causes of death were electrocutions (overhead power lines and buried, underground power lines), being struck by falling objects, drowning due to trench flooding, natural gas explosions, oxygen deficiency, poisoning, and falls into trenches.

Eighty percent of the trenching deaths occurred in the construction industry (SIC codes 15-17). Half of the construction industry employees killed were construction laborers.

The number of trench cave-in deaths appears to have dropped since the 1980s, according to the National Institute for Occupational Safety and Health (NIOSH). Based on data from its National Traumatic Occupational Fatalities Surveillance System for the 10 years 1980-89, NIOSH identified 606 deaths resulting from trench cave-ins, 468 of them (77%) in construction.<sup>1</sup> This amounts to 61 trench cave-in deaths/year, compared to 40 per year in 1992-99 (identified through BLS records). The 1980s data were likely an undercount, because the NIOSH system counted only death certificates where the box, "injury at work," was checked. Death certificates underreport work-related deaths, capturing, on average, 81% of such deaths.<sup>2</sup>

1. Nancy Stout and Catherine Bell, Effectiveness of Source Documents for Identifying Fatal Occupational Injuries: A Synthesis of Studies. *American Journal of Public Health*, 81(6):725-28, June 1991.

2. Anthony J. Suruda, Dawn N. Castillo, James C. Helmkamp, and Ted A. Pettit, Epidemiology of Confined-Space-Related Fatalities. In: National Institute for Occupational Safety and Health, Department of Health and Human Services. *Worker Deaths in Confined Spaces: A Summary of Surveillance Findings and Investigative Case Reports*. Cincinnati. DHHS (NIOSH), 94-103. January 1994.

**37a. Rate of deaths from falls, selected construction occupations, 1999****37b. Distribution of causes of deaths from falls in construction, 1992-99 average****37c. Percentage of collapses in selected fall categories in construction, 1992-99 average****37d. Breakdown of causes of trenching-related deaths, 1992-99 average**

*Note:* Chart 37a - Falls caused 380 deaths in construction in 1999. 30 or more deaths in each category, except, painter (26 deaths), supervisor (24), and electrical worker (15). "Ironworkers" includes structural metal workers and excludes welders and cutters. Because many construction workers work part time at construction, safety and health statistics are defined in terms of full-time equivalents to allow comparisons with other industries. Full-time work is defined as 2,000 hours worked per year. (Occupational categories are as follows: Ironworkers include only structural metal workers. Roofers, construction laborers, and painters include only those trades, not helpers. Carpenters include carpenters and their apprentices. Supervisors include only construction supervisors [occupational codes 503, 553- 558]. Electrical workers include electricians and their apprentices, plus electrical power installers and repairers.)

Chart 37b - "Other falls" includes falls through existing floor openings, from nonmoving vehicles, from aerial lifts, and so forth. Total of 2,712 deaths.

Chart 37c - Total collapses in each category were: suspended scaffolds, 47; aerial lifts, 36, roofs/skylights, 215; girders/structural steel, 22; supported scaffolds, 57; and ladders, 45. (Girders/structural steel is based on 116 deaths in the structural steel erection industry and does not include communications towers collapses, for instance.)

Chart 37d - Total of 429 trenching deaths, about 54 for each of the 8 years. Aerial lifts include scissor lifts and boom-supported lifts. "Other" includes struck by falling object while in trench, drowning as a result of trench flooding, and so forth.

*Source:* Based on data from Bureau of Labor Statistics, Census of Fatal Occupational Injuries and Current Population Survey, 1992-99. Calculations by Michael McCann and Risana Chowdhury, The Center to Protect Workers' Rights.